

## Environmental Protection Agency

## § 86.1227-96

- (ii)  $FID_{ppm}$  = FID reading in ppmC.
- (iii)  $SAM_{ppm}$  = methanol concentration in the sample bag, or gas bottle, in ppmC.  $SAM_{ppm}$  for sample bags:

$$= \frac{0.02406 \times \text{Fuel injected} \times \text{Fuel density}}{\text{Air volume} \times \text{Mol. Wt. CH}_3\text{OH}}$$

Where:

- (iv) 0.02406 = Volume of one mole at 29.92 in Hg and 68 °F, m<sup>3</sup>.
- (v) Fuel injected = Volume of methanol injected, ml.
- (vi) Fuel density = Density of methanol, 0.7914 g/ml.
- (vii) Air volume = Volume of zero grade air, m<sup>3</sup>.
- (viii) Mol. Wt. CH<sub>3</sub>OH = 32.04.

(d) The gas chromatograph used in the analysis of methanol samples shall be calibrated at least monthly following manufacturers' recommended procedures (certain equipment may require more frequent calibration based on use and good engineering judgment).

(e) *FID response factor to methane.* When the FID analyzer to be used for the analysis of natural gas-fueled vehicle hydrocarbon samples has been calibrated using propane, the methane response factor of the analyzer shall be established. To determine the total hydrocarbon FID response to methane, known methane in air concentrations traceable to National Institute of Standards and Technology (NIST) shall be analyzed by the FID. Several methane concentrations shall be analyzed by the FID in the range of concentrations in the exhaust sample. The total hydrocarbon FID response to methane is calculated as follows:

$$r_{CH_4} = FID_{ppm} / SAM_{ppm}$$

Where:

- (1)  $r_{CH_4}$  = FID response factor to methane.
- (2)  $FID_{ppm}$  = FID reading in ppmC.
- (3)  $SAM_{ppm}$  = the known methane concentration in ppmC.

[54 FR 14566, Apr. 11, 1989, as amended at 59 FR 48523, Sept. 21, 1994; 60 FR 34361, June 30, 1995]

### § 86.1226-85 Calibration of other equipment.

Other test equipment used for testing shall be calibrated as often as required

by the manufacturer or as necessary according to good practice.

### § 86.1227-90 Test procedures; overview.

(a) The overall test consists of prescribed sequences of fueling, parking, and operating conditions. Vehicles are tested only for evaporative emissions.

(b) The evaporative emission test (gasoline-fueled and methanol-fueled vehicles) is designed to determine hydrocarbon and/or methanol evaporative emissions as a consequence of diurnal temperature fluctuation, urban driving and hot soaks during engine-off periods. It is associated with a series of events representative of heavy-duty vehicle operation, which result in hydrocarbon and/or methanol vapor losses. The test procedure is designed to measure:

(1) Diurnal breathing losses resulting from daily temperature changes, measured by the enclosure technique;

(2) Running losses from suspected sources (if indicated by engineering analysis or vehicle inspection) resulting from a simulated trip on a chassis dynamometer, measured by carbon traps; and

(3) Hot soak losses which result when the vehicle is parked and the hot engine is turned off, measured by the enclosure technique.

(c) Background concentrations are measured for all species for which emissions measurements are made. For evaporative testing, this requires measuring initial concentrations. (When testing methanol-fueled vehicles, manufacturers may choose not to measure background concentrations of methanol, and then assume that the concentrations are zero during calculations.)

[54 FR 14568, Apr. 11, 1989, as amended at 60 FR 34363, June 30, 1995]

### § 86.1227-96 Test procedures; overview.

(a) The overall test consists of prescribed sequences of fueling, parking, and operating conditions. Vehicles are tested only for evaporative emissions.

(b) The evaporative emission test (gasoline-fueled, natural gas-fueled, liquefied petroleum gas-fueled, and methanol-fueled vehicles) is designed

to determine hydrocarbon and/or methanol evaporative emissions as a consequence of diurnal temperature fluctuation urban driving and hot soaks during engine-off periods. It is associated with a series of events representative of heavy-duty vehicle operation, which result in hydrocarbon and/or methanol vapor losses. The test procedure is designed to measure:

(1) Diurnal emissions resulting from daily temperature changes (as well as relatively constant resting losses), measured by the enclosure technique (see § 86.1233);

(2) Running losses resulting from a simulated trip on a chassis dynamometer, measured by the enclosure or point-source technique (see § 86.1234; this test is not required for gaseous-fueled vehicles); and

(3) Hot soak losses, which result when the vehicle is parked and the hot engine is turned off, measured by the enclosure technique (see § 86.1238).

(c) Background concentrations are measured for all species for which emissions measurements are made. For evaporative testing, this requires measuring initial concentrations. (When testing methanol-fueled vehicles, manufacturers may choose not to measure background concentrations of methanol, and then assume that the concentrations are zero during calculations.)

[58 FR 16052, Mar. 24, 1993, as amended at 59 FR 48523, Sept. 21, 1994; 60 FR 34363, June 30, 1995]

#### § 86.1228-85 Transmissions.

(a) All test conditions, except as noted, shall be run in a manner representative of in-use operation, and where appropriate, according to the manufacturer's recommendation to the ultimate purchaser.

(b) Except for the first idle mode, idle modes less than one minute in length shall be run with automatic transmissions in "Drive" and the wheels braked; manual transmissions shall be in gear with the clutch disengaged, except first idle. The first idle mode and idle modes longer than one minute in length shall be run with automatic transmissions in "Neutral," and manual transmissions shall be in "Neutral"

with the clutch engaged (clutch may be disengaged for engine start-up).

(c) The vehicle shall be driven with minimum accelerator pedal movement to maintain the desired operation.

(d) Accelerations shall be driven smoothly according to the manufacturer's recommendation to the ultimate purchaser. For manual transmissions, the operator shall accomplish each shift with minimum time. If the vehicle cannot accelerate at the specified rate, the vehicle shall be operated at maximum available power until the vehicle speed reaches the value prescribed for that time in the driving schedule.

(e) For those deceleration modes which decelerate to zero, manual transmission clutches shall be depressed when the speed drops below 15 mph (24.1 km/hr), when engine roughness is evident, or when engine stalling is imminent.

#### § 86.1229-85 Dynamometer load determination and fuel temperature profile.

(a) Flywheels, electrical or other means of simulating inertia shall be used. The value of equivalent inertia weight shall be within 250 pounds of the loaded vehicle weight (LVW). Loaded vehicle weight is defined as follows:

(1) For test vehicles which have an actual weight less than  $0.5 \times (\text{GVWR})$ ,

$$\text{LVW} = 0.5 \times (\text{Gross Vehicle Weight Rating})$$

(2) For test vehicles which have an actual weight (As tested) greater than  $0.5 \times (\text{GVWR})$ ,

$$\text{LVW} = \text{Actual Weight of Test Vehicle},$$

(b) *Power absorption unit adjustment.*

(1) The power absorption unit shall be adjusted to reproduce road load power at 50 mph true speed. The indicated road load power setting shall take into account the dynamometer friction. The relationship between road load (absorbed) power and indicated road load power for a particular dynamometer shall be determined by the procedure outlined in § 86.1218-85 or other suitable means.

(2) The road load power used shall be determined from the following equation: